
CAMBRIDGE

$\sqrt{\text{Mathematics}}$



Towards a shared framework?

A. Gardiner
(E. Orr, C. Nyle)

The Framework

(Cambridge Mathematics quote, my addition in italics)

What it is

“a *coherent and flexible* presentation of the mathematics with which students aged 5 to 19 could be *reasonably expected* to engage”

What it does

- Maps domain knowledge
- Organises progressions in concepts and skills
- Provides anchors for linking domain knowledge to implementation”

Mathematics education vs Medicine

- Primitive: herbs; experience/tradition; magic/God
- *Pseudo-science: 'models', but no method/check*
- *Greek/Renaissance: "Go look/think for yourself"*
(Hippocrates; Galen; Vesalius, Harvey, ...)
- *Practitioners (barber-surgeons) vs 'professionals'*
- **Towards a Scientific Method** (Edward Jenner, John Snow, Florence Nightingale, Louis Pasteur,...)
- "Modern medicine"

“Whose curriculum is it anyway?”

The question:

- denies absolutes: “elem^y maths = indep of culture”
- rejects the only path to gradual improvement (through respecting, reflecting on, learning from, and improving on past experience)

Convenient for advocating one’s preferred ‘model’

- first to insist on the right to **one’s own** place in the sun
- then to re-define **oneself** to be the “Good Guy”, and everyone else to be (more-or-less) “Baddies” (of different alleged persuasions)

Who gains?

The Magical M*stery Tour ...
Is coming to take you away ...
They've got everything you need ...
Satisfaction guaranteed.

Choose: t***s; or t***s; or T***S (+ ...);

- National Curriculum uses the F-word (x24; M-word x0): resented by some as too specific/narrow
- Singapore/Shanghai/... focus attention on **long-term teaching**; but “M*****” never clarified
- Re-interpreted as something less specific → slogan
- Gets confused with an amalgam of:
 - (a) a diet of “rich” t***s (disjointed, **non-cumulative**)
 - (b) “Big Ideas” (appealing to many, but **no meaning**)
 - (c) shallow behaviourist brainwashing + t***s (Skinner, Bloom: dice/test/reward = “tick off sublevels”. **Doesn't work**)

Look for an alternative to: Big-enders and Little-enders, Cowboys and Indians, “Us” and “Them”

- Reject crude dichotomies (progressive-conservative, etc), grotesque caricatures, and half-baked slogans
- Recognise: **effective** systems build on **consensus** + analysis

Then look to see

- to what extent **elementary maths** makes consensus **easy**;
- and where there is genuine scope for disagreement.

Then

- identify the effective alternatives; explore; make choices

Towards an alternative?

- Cannot pre-empt the path to consensus; so be tentative
- Lay aside personal preferences; focus on the **goal** = independent young adults within society
- Be pragmatic: distinguish a *small number* of pathways
 - shared up to a point, then diverging (to reflect goals)
- My reading of the evidence (first three phases):
 - **EY**: physical, social and linguistic preparation for KS1
 - **KS1/2**: language, seeing / doing / drawing / making, number / measurements – from Concrete to **Abstract**
 - **KS3A/B**: (**A**: consolidating KS1/2 and leading to “**Voc**”
B: building on KS1/2 to GCSE+)

Towards a consensus: Details → universal T***S?

- **Concrete-Abstract:** Sort out why **KS1/2** "**Abs**" is "for **all**"
- **Vocational/Academic:** prepare **all** for **choice** (at 13-15?)
- **EY:** Try to agree goals; pros/cons of "formal work"
- **KS1/2:** Try to agree on "together" vs "group/individual"
("together/group" → class-teaching + intervention;
"individual" → less class-teaching + out of phase)
- Postpone details of "language, doing/drawing/making"
until endpoints agreed for KS1/2
- "Number/measurement": Sort out essential ingredients
+ endpoints, and how these are **effectively** taught **to all**
- **KS3A/B:** **A** – our experience is limited (learn from others);
B – fairly clear (negs, fracs, propn, alg, func, geom?, prob/stats)

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